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Original Article

Physical activity and quality of life among community-dwelling older people in Indonesia: an intervention study

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Abstract

Objective: Physical activity programs have been shown to be beneficial in maintaining the health status of older people and valuable in supporting quality of life (QOL). However, few studies have addressed the association between physical activity and QOL in Indonesia. This study aimed to determine whether physical activity leads to enhancement in the QOL domains of physical health, psychological health, social relationships, and environment.
Methods: An intervention study of 282 older people (mean age 65.3 years; 72% women) living in the community was conducted. Using a simple randomization, participants were divided into either a treated or control group. Participants in the treated group (n=132) participated in a physical activity program twice a week for 20 weeks between October 2012 and March 2013. The control group (n=150) did not perform any coached physical activity during the study period.
Results: Significant increases were seen in the domains of physical health (p=0.001), psychological health (p=0.002), and social relationships (p=0.001), as well as total QOL (p=0.001) in the treated group between baseline and post-intervention. However, there was no significant difference in QOL domains within the control group between baseline and post-intervention. Moreover, physical activity was a significant positive predictor for both physical health (p<0.05) and total QOL score (p<0.001).
Conclusions: This study suggests that community-based physical activity programs enhance QOL in older people. This is the first intervention study to report significant improvement in physical health and QOL as a result of physical activity intervention in Indonesia.

Key Words

health promotion, Indonesia, older people, physical activity, quality of life

Introduction

Indonesia has recently begun to face major age-related issues as the aged population continues to grow. As such, aging will soon become a policy concern that will require government attention. To ensure that older people receive adequate support, several new laws have recently been passed [1]. One of the main expected outcomes of these laws is significant improvement in quality of life (QOL). Andrews noted that greater efforts in terms of health promotion and disease prevention in old age are required to ensure the health and well-being of the growing numbers of older people [2]. Even though high

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morbidity, high mortality rates, low education, and socio-economic issues are also involved, physical activity has been shown to be beneficial to maintaining the health status and QOL of older people when faced with several health problems [3] . QOL is a difficult and complex idea to describe. Addressing the conceptual issues and the ensuing challenges of assessing QOL are essential in the context of long-term care for older people [4] .

Gabriel and Bowling stated that the main themes of QOL were social relationships, help and support, psychological well-being, activities, health and functional ability, mobility, social activities, and having good health [5] . It follows that QOL has both macro-societal and socio-demographic influences on people and the personal characteristics and concerns of individuals also come into play. Rejeski and Mihalko suggested that QOL was a conscious cognitive opinion of satisfaction in life, and could be measured with the Satisfaction Life Scale [6] .

QOL of older people in Indonesia remains low. This is related to low education and socio-economic levels [7] . Aerobic physical activity was established in Indonesia in the 1990s and was originally developed by the Ministry of Health. However, the prevalence of physical activity in Indonesia is below the metabolic energy turnover score of physical activity [8] , which means that the intensity of physical activity (amount of energy expended) for most people is low relative to sitting quietly. Most studies on physical activity and metabolic energy turnover were conducted using questionnaires asking about work, transport, and leisure activities. Figueira et al. found that physical activity was related to emotional and social health and led to an improvement in QOL [9] . That study used open-ended responses and physical activity was shown to contribute to all aspects of QOL in a focused group [10] . A previous study comparing physical activity performed in classes and at home showed that older people who attended classes had better health-related QOL (HRQOL) than their counterparts who performed the same program activities at home [11] .

The health benefits of physical activity are well established [12, 13] . Archer and Blair stated that physical activity and chronic diseases demonstrate a strong inverse relationship [14] . Therefore, the health benefits and effects of physical activity are irrefutable. Vainionpää et al. suggested that weight-bearing exercises might also have a positive effect on several cardiovascular risk factors [15] . Meanwhile, Francis showed that regular physical activity can help to control and decrease the risk of congestive heart disease [16] .

Those that are not physically active have an increased risk of loss of health and mortality [17] . Indeed, the declining levels of physical activity that are currently seen in many countries have major complications for the health of the global population in general, and for the prevalence of obesity, raised blood sugar, non-communicable diseases such as cardiovascular disease, coronary heart disease [18] , hypertension [19] , diabetes [20] , cancer [21] , and depression [22] , as well as other health issues. The World Health Organization (WHO) assess reductions in physical activity as being the primary cause of approximately 21–25% of breast and colon cancer cases, 27% of diabetes cases, and 30% of ischemic heart disease cases [23] .

Study of the relationship between physical activity and QOL domain changes has been undertaken previously in countries such as the United States, Canada, Germany, and Japan. Both clinical settings and community-based interventions of QOL have been studied. McAuley et al. mentioned that older people who were active had greater self-efficacy, which was related to a more positive physical and mental health status [24] . McAuley et al. also suggested that health status becomes more positive in relation to satisfaction with life. Therefore, self-efficacy plays a key role in QOL through physical and mental health status. Anokye et al. found that individuals with higher physical activity levels had higher values in all HRQOL domains [25] .

The results of previous studies validate the importance of physical activity in improving QOL. However, these studies have only dealt with the situation in progressive countries, whereas there are few studies focusing on the situation in developing countries. Additionally, few studies in Indonesia have addressed the association between physical activity and QOL in older people. As such, investigation of physical activity in older people in developing countries is required to clarify the relation between physical activity and QOL. Therefore, we conducted an intervention study to appraise the link between physical activity and QOL among older people living in the community in Indonesia with the aim of examining the influences of physical activity on the enhancement of the QOL domains of physical health, psychological health, social relationships, and environment. We hypothesized that older people who engaged in a

physical activity program would experience positive changes in QOL.

Materials and Methods

1. Study design and participants

This was an intervention study of people aged ≥ 60 years living in the community in Surakarta District, Central Java, Indonesia. Between July and September 2012, eligible participants were recruited from senior residents' associations by registered nurses during monthly health check-ups that are offered to older people to monitor their health status. We introduced the study to approximately 400 potential participants who met the following inclusion criteria: aged ≥ 60 years, literate, able to communicate and cooperate with investigators, did not have disease (e.g., diabetes mellitus, heart failure, renal impairment), and had not engaged in regular physical activity for 20 minutes or more at least twice a week in the past year. Participants received details of the purposes, risks, and procedures involved prior to enrollment in the study. The first 300 consecutive participants who met the inclusion criteria and provided written informed consent were included in the study. This study was approved by the Ethics Board of Kanazawa University, Japan (number 415).

By using the simple randomization technique of flipping a coin, the eligible participants were divided into either a treated or control group to assure near-equal samples in both groups. Each group consisted of 150 participants.

The treated group performed about 50 minutes of physical activity twice a week at the Surakarta Heart Foundation for a duration of 20 weeks between October 2012 and March 2013. Participants allocated to the control group were instructed not to carry out any coached physical activity and were informed that they would be invited to participate in the physical activity program after the end of the study. The participants' health status was determined on the basis of a self-reported medical history.

2. Physical activity program

We based our physical activity program on a program developed by the Asia-Pacific Physical Activity Network which includes recreational and leisure-time physical activities to improve cardiorespiratory and muscular fitness, as well as bone and functional health [26]. The content of the physical activity program in the current study followed the guidelines of both the Asia-Pacific Physical Activity Network and the WHO with some minor differences. For instance, physical activity instructions were provided by a trained coach and participants were required to regularly attend sessions at the same place and time each week so that they could be followed more precisely.

Participants received individual instruction and information prior to beginning the program. The participants in the treated group attended sessions limited to 40 – 50 people. During the physical activity sessions, a training coach monitored the participants to ensure quality and consistency of the program. Each physical activity session consisted of a 5 – 10 minute warm-up followed by 30 – 35 minutes of physical activity and a 5 – 10 minute cool-down. Both the warm-up and cool-down were vital to ensure that the body was not injured and to allow the heart rate to rise and fall gradually. The physical activities included exercises to improve muscle strength and postural balance, and rhythmic movements using large muscle groups such as the legs, hips, back, chest, abdomen, shoulders and arms. The exercises were lifting the foot, walking in place, bowing the head and holding, tilting the head from left to right, rotating the shoulders forwards and backwards, running in place while stretching the arms forward and upward, pushing the arms to the front and the side, rotating the body from left to right, lifting the left and right knees, and swinging both arms to the left and right. The sessions also occasionally included various folk dances. All joint movements had to be performed correctly in order to exercise the muscles and produce the optimal effects. Participants were instructed to check their pulse twice: prior to and after the physical activity.

3. Outcomes

The main outcome was the variance in the QOL domains of physical health, psychological health, social relationships, and environment. The World Health Organization Quality of Life BREF (WHOQOL-BREF) questionnaire was administered to assess QOL. This questionnaire is widely used, reliable, and a valid method of measuring QOL in a variety of large populations [27]. The questionnaire was administered through interviews and contained a total of 24 questions covering the four domains, with seven items on physical health, six items on psychological health, three items on social relationships, eight items on environment, and subsection questions related to different aspects of life such as age, gender,

educational level, marital status, smoking status, and body mass index. Based on the WHOQOL-BREF, physical health domain consisted of activities of daily living, energy and fatigue, mobility, pain and discomfort, and work capacity. Psychological health involved bodily image, self-esteem, and personal belief. Social relationships contained personal relationship, social support, and sexual activity. Moreover, environment included financial resources, physical safety, health and social care, home and physical environment, and leisure activities.

Skevington et al. stated that the WHOQOL-BREF was an instrument that conceptually fits the WHO definition of QOL. The average of internal consistency of the questionnaire for 23 countries was 0.68 (r = 0.51 – 0.77) . The Indonesian version of the WHOQOL-BREF questionnaire was validated in a study by Salim et al.[28] , which reported a good internal consistency ranging from 0.70 to 0.91, except for social relationships (r = 0.41) .

The mean score for all items was calculated using a 5-point Likert scale ranging from 1 (not at all) to 5 (completely) . The mean score of items within each domain was used to calculate the domain score. Mean scores were then multiplied by four in order to make the domain score comparable to the score used in the WHOQOL-100 questionnaire, of which the WHOQOL-BREF is an abbreviated version. The transformation method was used to convert raw scores to numeric scores on a scale of 0 – 100. Domain scores were scaled in a positive direction with a higher score corresponding to better QOL.

Socio-demographic data such as age, gender, educational level, marital status, height, and weight were recorded. Height was measured using a tape measure with the participants standing on a horizontal surface and values were recorded in centimeter (cm) . Weight was measured using a standard scale with participants wearing lightweight clothes and values were recorded in kilogram (kg) . Body mass index (BMI) was calculated according to the WHO standard formula and recorded in weight/height^2.

4. Statistical analysis

We used a chi-square test to determine the differences between the two groups in terms of socio-demographic measurements. We also used an unpaired t-test to define any differences in socio-demographic measurements. A paired t-test was used to compare different scores in the QOL domains between baseline and after 20 weeks of intervention. The association between the QOL domains and the independent variables was measured using Spearman's rank correlation. Multiple linear regression analysis using the enter selection method (all possible method) was conducted to determine the relationship between the QOL domains and several other covariate such as age, gender, educational level, marital status, smoking status, BMI, and physical activity[29] . The whole set of variables was entered into a multiple regression model that also contained the all covariate, such as age, gender, educational level, marital status, smoking status, BMI, and physical activity to calculate the coefficient of determination. We constructed five types of multiple regression models to assess associations, where the dependent variable was each of the WHOQOL-BREF domains. We used the F test to obtain the model of best fit for the four QOL domains. For all variables, standardized β–coefficients were calculated. Confidence interval was calculated for the β–estimate. All p values were two-sided; a statistical significance level of $p < 0.05$ was used for all comparisons. Measurements are reported as mean and standard deviation (SD) . SPSS version 17.0 for Windows was used to analyze all data.

Results

1. Demographics

Out of the 300 participants who enrolled in this study, 282 were included in the final analyses. The mean age was 64.36 (SD=3.94) in the treated group and 66.16 (SD=4.42) in the control group. Of the 150 participants assigned to the treated group, 132 completed the full 20-week intervention; 18 participants dropped out due to health reasons. A complete participants in the control group (N = 150) remained to contribute until the end of study.

The baseline characteristics of the participants in both groups are shown in Table 1. There were no differences in characteristics between groups at baseline. Both groups were nearly three-fourths female, although there were slightly fewer females in the treated group than in the control group ($p > 0.05$) . The mean age was slightly higher in the control group than the treated group. Both groups consisted mainly of married participants.

Table 2 shows the mean and SD of the participants' QOL score by domain. This comparison using an unpaired t-test showed that the scores for social relationships

Table 1. Comparison of baseline characteristics between the treated and control groups

Variables	Treated Group (N = 132) n (%)	Control Group (N = 150) n (%) p	p
Gender			
Male	41 (31.1)	38 (25.3)	0.063[a]
Female	91 (68.9)	112 (74.7)	
Age (mean ± SD)	64.36 ± 3.91	66.16 ± 4.42	0.371[b]
Education level			
Elementary	50 (37.9)	105 (70.0)	0.073[a]
Junior High & over	82 (62.1)	45 (30.0)	
Marital status			
Married	108 (81.8)	129 (86.0)	
Not married	24 (18.2)	21 (14.0)	0.211[a]
Smoking status			
Active	14 (10.6)	27 (18.0)	
Never	94 (71.2)	108 (72.0)	0.143[a]
Seldom	24 (18.2)	15 (10.0)	
Body mass index (mean ± SD)	23.79 ± 2.34	23.28 ± 2.56	0.201[b]

Data are shown as mean ± standard deviation, and percentages.
[a]Chi-square test
[b]t-test

Table 2. Baseline scores for the four quality of life domains in the treated and control groups

Domain	Treated Group (N = 132)	Control Group (N = 150)	p
Physical health	61.78 ± 7.22	61.40 ± 7.10	0.151
Psychological health	62.24 ± 12.30	61.05 ± 14.69	0.215
Social relationships	52.89 ± 15.27	52.15 ± 16.24	0.150
Environment	67.65 ± 8.45	67.29 ± 8.31	0.256
Total score QOL	66.89 ± 4.59	65.88 ± 4.50	0.099

Data are shown as mean ± standard deviation
t-test

were the lowest among all domains. The mean scores of physical health, psychological health, social relationships, environment, and total score QOL were 61.78, 62.24, 52.89, 67.65, and 66.89, respectively in the treated group at baseline. The scores for the domain of social relationships were the lowest in both groups.

2. Effect of physical activity on QOL

We used a paired t-test to compare QOL changes between baseline and post-intervention. No significant differences were found for any of the four QOL domains in the control group. However, in the treated group, trends indicating significant increases in physical health ($p = 0.001$), psychological health ($p = 0.002$), social relationships ($p = 0.001$), and total QOL ($p = 0.001$) were found; no significant increases were found in the environment domain (Table 3). The scores for the social relationships domain showed the highest increases among all four domains in the treated group.

Table 4 shows the results of Spearman's rank correlation between several independent variables and QOL domains. There was a positive association between physical activity and physical health domain ($r = 0.317$ $p < 0.05$). No correlation was found between age, gender, educational level, marital status, BMI and physical health domain. Again, physical activity showed a positive relation with the total score QOL ($r = 0.329$ $p < 0.05$). With regard to QOL domains, only age was negative relation with the psychological health domain ($r = -0.219$ $p < 0.05$).

Table 3. Comparison of mean differences in the four quality of life domain scores between baseline and post-intervention

Domains	Treated Group (N = 132)	p	Control Group (N = 150)	p
Physical health		0.001		0.083
Baseline	61.78 ± 7.22		61.40 ± 7.10	
Post intervention	63.17 ± 7.11		61.42 ± 7.10	
Psychological health		0.002		0.153
Baseline	62.24 ± 12.31		61.05 ± 14.69	
Post intervention	64.43 ± 10.61		61.24 ± 14.47	
Social relationships		0.001		0.052
Baseline	52.89 ± 15.27		52.15 ± 16.23	
Post intervention	56.36 ± 14.33		53.09 ± 14.97	
Environment		0.134		0.565
Baseline	67.65 ± 8.45		67.29 ± 8.31	
Post intervention	67.69 ± 8.41		67.31 ± 8.30	
Total score QOL		0.001		0.061
Baseline	66.64 ± 4.59		65.88 ± 4.50	
Post intervention	66.89 ± 4.47		66.04 ± 4.42	

Data are shown as mean ± standard deviation
Paired t-test

Table 5 shows the results of multiple regression analysis relating QOL domain scores to predictor variables. The scores obtained from the F-test of model fit for the variables explaining the four QOL domains were $F = 4.24$ ($p = 0.03$; $R2 = 0.06$), $F = 5.47$ ($p = 0.01$; $R2 = 0.05$), $F = 4.03$ ($p = 0.03$; $R2 = 0.05$), $F = 1.86$ ($p = 0.12$; $R2 = 0.03$), and $F = 6.01$ ($p = 0.01$ $R2 = 0.11$), respectively. With regard to QOL domains, age, gender, educational level, marital status, smoking status, BMI, and physical activity were entered as covariate in the multiple regression model to predict the coefficients of determination. Evidence from this study shows physical activity was a positive predictor of physical health domain ($\beta = 0.312$; $p < 0.05$). Physical activity showed a major predictor of the total score QOL as well ($\beta = 0.325$; $p < 0.001$). Furthermore, age was a significant negative predictor of psychological health ($\beta = -0.217$; $p < 0.002$), while BMI was a significant positive predictor of psychological health domain ($\beta = 0.140$; $p < 0.022$).

Discussion

The present study aimed to evaluate the importance of physical activity in terms of improving QOL among

older people. The main findings of this investigation were that older people who participated in a community-based physical activity program twice a week had higher improvements in the QOL domains of physical health (i.e., activities of daily living, mobility, and energy) , psychological health (i.e., bodily image and self-esteem) , and social relationships (i.e., personal relationships and social support) than those who were not engaged physical activity. In this study, the mean scores in the domains of physical health, psychological health, and environment were above average. The highest increases among the four QOL domains were observed in the social relationships domain. Since significant improvements were observed post-intervention in all QOL domains except for environment, the results support our hypothesis that older people who engaged in a physical activity program would experience positive changes in their QOL.

To the best of our knowledge, this is one of the first studies based on a community intervention in Indonesia to show that improvements in QOL could be attributed solely to increased physical activity. We followed the Asia-Pacific Physical Activity Network recommendations to measure QOL changes pre- and post-intervention. We believe that the improvements in the QOL domains observed in this study were influenced by participation in the 20-week physical activity program. As suggested by prior work in this field, QOL enhancement is relevant even if the R^2 values on the regression model are not high.

The literature is varied regarding physical activity and QOL in older people, partly because of the different study designs used and different ways of measuring physical activity and QOL. In a study of older people using self-report assessment tools, physical activity was associated with better health status and global QOL [30] . In a non-randomized intervention study by Taguchi et al., a small sample of nursing home residents with minor disabilities showed no significant differences in HRQOL after a 12-month program of supervised exercise [31] . On the other hand, in a longitudinal study representative of non-institutionalized older people, Balboa-Castillo et al. showed that a leisure-time physical activity and sedentary behavior program lasting 3 years led to improvements in physical functioning, physical role, and vitality [32] . The strength of the latter study was that analyses were adjusted simultaneously for leisure-time physical activity and sedentary behavior.

Table 4. Correlation between several independent variables and QOL domains

	1	2	3	4	5	6	7	8	9	10	11	12
1.Age	1.000											
2.Gender	0.131	1.000										
3.Educational level	0.101	0.225	1.000									
4.Marital status	0.204	0.099	0.095	1.000								
5.Smoking status	0.091	0.129	0.200	0.097	1.000							
6.Body mass index	0.131	0.106	0.117	0.112	0.113	1.000						
7.Physical activity	0.167	0.268	0.203	0.055	0.112	0.107	1.000					
8.Physical health	-0.023	0.135	0.112	0.048	0.099	0.019	0.317*	1.000				
9.Psychological health	-0.219*	0.125	0.079	0.117	0.120	0.141	0.069	0.273	1.000			
10.Social relationships	-0.071	0.098	0.119	0.075	0.183	0.102	0.111	0.219	0.313	1.000		
11.Environment	-0.014	0.076	0.028	0.027	0.125	0.085	0.027	0.092	0.135	0.199	1.000	
12.T-QOL	-0.089	0.107	0.116	0.093	0.126	0.110	0.329*	0.293	0.242*	0.291	0.097	1.000

Spearmen rank-correlation coefficient *p < 0.05

Table 5. Multiple linear regression analysis with several independent baseline variables predicting QOL domains

	Coefficient of multiple regression from QOL domains									
	PH		PS		SR		EN		T-QOL	
Variables	β	p	β	p	β	p	β	p	β	p
Age	-0.023	0.162	-0.217	0.002	-0.069	0.131	-0.013	0.878	-0.080	0.178
Gender	0.135	0.099	0.129	0.108	0.097	0.116	0.077	0.201	0.104	0.087
Educational level	0.112	0.114	0.071	0.408	0.120	0.167	0.024	0.739	0.117	0.096
Marital status	0.049	0.484	0.115	0.098	0.074	0.296	0.026	0.709	0.091	0.136
Smoking status	0.060	0.392	0.021	0.161	0.004	0.956	0.018	0.983	0.025	0.676
Body mass index	0.018	0.128	0.140	0.022	0.105	0.131	0.085	0.084	0.111	0.056
Physical activity	0.312	0.040	0.069	0.249	0.111	0.063	0.025	0.573	0.325	0.001
R^2	0.06		0.05		0.05		0.03		0.11	

All listed variables were entered in the multivariate regression model as possible determinants in all QOL domains.
All analyses were adjusted for age, education level, marital status, smoking status, and body mass index.
Abbreviation: PH= physical health, PS= psychological health, SR= social relationships, EN= environment,
T-QOL= total score quality of life
Overall statistical significance (F-test) for each model was p < 0.05

Several cross-sectional studies in older people have shown a positive association between physical activity and QOL [33-36]. Acre et al. showed that physical activity in older people measured by the Johnson Space Center scale was associated with all eight HRQOL domains in the Medical Outcomes Survey short form-36 questionnaire [37]. In addition, in an Internet-based survey of registrants of an Internet research service in Japan [38], a group of older people who performed exercises in the active group reported higher physical functioning and physical component scores than the inactive group. The active group also had significantly higher general health perception scores than the insufficient exercise and inactive groups. Likewise, in another study of 156 older people living at home with good cognitive function, higher activity levels were associated with better QOL scores and satisfaction with participation varied according to activity level [39]. However, these differences were clinically significant only between participants without activity limitations and those with moderate to severe activity limitations.

We believe that the mental health and/or mental component summaries in previous works are similar to the psychological health domain in this study [38, 40]. We also suggest that QOL improved in the treated group largely due to the participants' experience in the physical activity program. Participation in physical activity led to significant improvements in psychological health. The influences of physical activity on QOL have been well established in previous studies, but the relationship to other health outcomes is more complex [30, 40]. Prior investigators have suggested that physical activity and QOL are mediated by self-efficacy. McAuley et al. reported that the relationship between physical activity and the QOL domains also operates with self-efficacy. Self-efficacy has been frequently associated with mental and physical health status [40]. Self-efficacy plays an instrumental role in QOL.

Our results show that physical activity as performed in the physical activity program improved the QOL of the treated group in this study. The enhanced QOL associated with increased physical activity may be a consequence of several mechanisms, such as reduced cardiovascular risk factors, prevention and management of chronic diseases [14-16], prevention of high blood pressure [19], and lower risk of mental disorders like depression and anxiety [22]. McAuley et al. suggested that physical activity directly influences self-efficacy and, through it, acts on HRQOL, especially on components of mental health [24, 40]. This study is consistent with that of McAuley et al., since improvements were observed in the psychological health domain, and relevant effects were also seen in the domains of physical health and social relationships.

Participation in a physical activity program may help maximize postural balance due to increased muscle strength. It may also decrease the risk of developing mental and physical health conditions that result from inactivity. Many factors influence the ability and willingness to engage in physical activity. Many older people in Indonesia are not capable of performing physical activity by themselves. Due to the lack of welfare programs and health facilities, it may be difficult for some people to have an active lifestyle to maintain their health. The government and the private sector should promote national programs to increase older people's awareness of the importance of physical activity.

Some limitations in the current study should be noted. This study was carried out with a sample of older people who may have had better health conditions than the general population, and this may have positively influenced their QOL. It is also possible that QOL had an effect on physical activity in our study. In future studies, it could be important to determine whether different types of physical activity enhance QOL. Although the activity program was designed for the treated group and followed the guidelines established by WHO, the results may be biased due to the short study duration of 20 weeks. We need a longer study period to obtain more precise measurements of changes in QOL and to confirm the causality of the relationship between physical activity and QOL. However, this research is a step towards understanding variation and participation in physical activity according to the activity of community-dwelling older people. It should also be noted that the recruitment method in the current study used consecutive participants who met the inclusion criteria, and this may have influenced our results. Additionally, QOL measures were obtained by self-reported questionnaires. However, this limitation is minimized since the questionnaire was found to be valid and reliable [27, 28, 41].

In conclusion, the physical activity program clearly resulted in enhanced physical health, psychological health, and social relationships. These enhancements result in

positive improvements in QOL and it is recommended that physical activity be promoted to the general public. To develop or improve QOL, specific attention should be given to older people who are physically inactive and/or in poor physical health. As noted by the WHO guidelines, physical activity is important as it leads to the awareness and prevention of mortality risk factors. The current study has a number of implications in both research and practice and may positively influence adherence to community exercise programs. Incorporating more than 1 hour of physical activity each week into the lifestyles of older persons who are already slightly active may improve their QOL. We need to be more effective in promoting physical activity programs as an integral component of a healthy lifestyle in Indonesia.

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